General

Guideline Title

ACR Appropriateness Criteria® resectable rectal cancer.

Bibliographic Source(s)

Jones WE III, Thomas CR Jr, Suh WW, Herman JM, Abdel-Wahab M, Azad N, Blackstock AW, Das P, Goodman KA, Hong TS, Jabbour SK, Konski AA, Koong AC, Rodriguez-Bigas M, Small W Jr, Zook J, Expert Panel on Radiation Oncology - Rectal/Anal Cancer. ACR Appropriateness CriteriaÂ® resectable rectal cancer. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 9 p. [48 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version. Suh WW, Johnstone PA, Blackstock AW, Herman J, Konski AA, Mohiuddin M, Poggi MM, Regine WF, Rich TA, Cosman BC, Saltz L, Expert Panel on Radiation Oncology-Rectal/Anal Cancer. Resectable rectal cancer. [online publication]. Reston (VA): American College of Radiology (ACR); 2007. 7 p.

Recommendations

Major Recommendations

ACR Appropriateness Criteria®

Clinical Condition: Resectable Rectal Cancer

Variant 1: 70 year old woman staged with endorectal ultrasound (EUS), a T2NX rectal cancer at 3 cm from verge. Final pathology was T3N1 status post abdominoperineal resection (APR). KPS ≥70.

Treatment	Rating	Comments
Treatment Option		
RT + chemotherapy	9	
RT alone	2	
Chemotherapy alone	2	
Rating Scale: 1,2,3 Usually inappropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate		

45 Gy/1.8 Gy Treatment	Rating	Comments
50.4 Gy/1.8 Gy	9	
54 Gy/1.8 Gy	8	If small bowel is completely excluded after 50.4 Gy.
59.4 Gy/1.8 Gy	3	If small bowel is completely excluded after 50.4 Gy.
Simulation		
Patient prone	9	Unless physically unable. If using IMRT technique, may prefer supine.
Small bowel contrast at simulation	9	Not mandated with CT simulation.
Patient immobilized	9	
Use belly board	9	Only needed if prone.
Perineal scar marker	9	
Bladder full at simulation	7	
If RT + Chemo: RT Volume		
L5/S1 pelvis to include perineal scar	9	
L5/S1 pelvis to bottom of ischial tuberosity	1	
RT Technique		
3 or 4 field with photons	9	Depending on clinical situation.
AP/PA	1	
3 field with electron boost to perineum	3	
4 field with electron boost to perineum	3	
IMRT	6	May be appropriate depending on the clinical situation on a case-by-case basis. Enrollment in a clinical trial preferred.
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: 70-year-old woman staged with EUS, aT2NX rectal cancer with caudal extent located 9 cm from verge. Final pathology was T3N1 status post LAR. KPS ≥70.

Treatment	Rating	Comments
Treatment Option		
RT + chemotherapy	9	
RT alone	2	
Chemotherapy alone	2	
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate		

Treatment	Rating	Comments
45 Gy/1.8 Gy	6	
50.4 Gy/1.8 Gy	9	
54 Gy/1.8 Gy	8	If small bowel is completely excluded after 50.4 Gy.
59.4 Gy/1.8 Gy	3	If small bowel is completely excluded after 50.4 Gy.
Simulation		
Patient prone	9	Unless physically unable. If using IMRT technique, may prefer supine.
Small bowel contrast at simulation	9	Not mandated with CT simulation.
Patient immobilized	9	
Use belly board	9	Only needed if prone.
Anal marker	9	
Bladder full at simulation	7	
If RT + Chemo: RT Volume		
L5/S1 pelvis to include anal marker	2	CT simulation preferred. Use CT to ensure margin on inferior extent of tumor. Technically, the field should extend 2-3 cm below the anastomosis on the CT.
L5/S1 pelvis to bottom of ischial tuberosity	5	CT simulation preferred. Bony landmark is an approximation. Use CT to ensure margin on inferior extent of tumor. Technically, the field should extend 2-3 cm below the anastomosis on the CT.
RT Technique		
3 or 4 field with photons	9	Depending on clinical situation.
AP/PA	1	
IMRT	6	May be appropriate depending on the clinical situation on a case-by-case basis. Enrollment in a clinical trial preferred.
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 3: 60-year-old woman with circumferential lesion with caudal extent located 8 cm from verge. EUS stage T3N1. KPS ≥70.

Treatment	Rating	Comments
RT		
Preoperative RT + chemo	9	
Postoperative RT + chemo	3	
Preoperative RT alone	1	
Postoperative RT	1	
If Preoperative RT: RT Dose		
45 Gy/1.8 Gy	6	
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate		

Treatment	Rating	Comments
50.4 Gy/1.8 Gy	9	
54 Gy/1.8 Gy	7	If small bowel is completely excluded after 50.4 Gy.
59.4 Gy/1.8 Gy	2	If small bowel is completely excluded after 50.4 Gy. For fixed lesions only.
5 Gy X 5	1	
Surgery		
LAR	9	
APR	1	Only if LAR not technically possible.
If Postoperative RT: RT Dose		
45 Gy/1.8 Gy	6	
50.4 Gy/1.8 Gy	9	
54 Gy/1.8 Gy	8	If small bowel is completely excluded after 50.4 Gy.
59.4 Gy/1.8 Gy	3	If small bowel is completely excluded after 50.4 Gy. For fixed lesions only.
5 Gy × 5	1	
Simulation		
Patient prone	9	Unless physically unable. If using IMRT technique, may prefer supine
Small bowel contrast at simulation	9	Not mandated with CT simulation.
Patient immobilized	9	
Use belly board	9	Only needed if prone.
Anal marker	9	
Bladder full at simulation	7	
RT Technique		
3 or 4 field with photons	9	Depending on clinical situation.
IMRT	6	May be appropriate depending on the clinical situation on a case-by-case basis. Enrollment in a clinical trial preferred.
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 4: 45-year-old woman with EUS staged T4N0, 4 cm lesion at 3 cm from verge with extensive involvement of the anal canal. KPS ≥70.

Treatment	Rating	Comments
Treatment Options		
Preoperative RT + chemo followed by surgery	9	LAR, if possible.

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

Treatment	Rating	Comments
Preoperative RT followed by surgery	2	
Surgery followed by adjuvant treatment if pT3+ and/or LN+	1	
If Preoperative RT: RT Dose		
45 Gy/1.8 Gy	6	
50.4 Gy/1.8 Gy	9	
54 Gy/1.8 Gy	8	If small bowel is completely excluded after 50.4 Gy.
59.4 Gy/1.8 Gy	3	If small bowel is completely excluded after 50.4 Gy. For fixed lesions only.
5 Gy × 5	1	Will not provide sufficient downstaging.
Simulation		
Patient prone	9	If using IMRT technique, may prefer supine.
Small bowel contrast at simulation	9	Not mandated with CT simulation.
Patient immobilized	9	
Use belly board	9	Only needed if prone.
Anal marker	9	
Bladder full at simulation	7	
If Preoperative RT: RT Volume		
Pelvis to L5/S1 + boost	8	
Pelvis to L5/S1 + inguinal LN + boost	9	With extensive involvement of anal cancer.
RT Technique		
3 or 4 field with photons	9	Depending on clinical situation.
AP/PA	1	
3 field with electron boost to perineum	3	
4 field with electron boost to perineum	3	
IMRT	8	Using atlas for target delineation. Based on anal cancer data. May be helpful to treat inguinal lymph nodes and to reduce side effects.
If Preoperative RT + Chemo: Time between RT & Surgery		
2-4 weeks	2	
>4-6 weeks	5	
>6-8 weeks	8	
>8 weeks	1	Extended delay usually inappropriate

Treatment	Rating	Comments
		encourage enrollment in clinical trial

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Summary of Literature Review

In 2004, a randomized trial from Germany was published establishing a regimen of preoperative chemoradiotherapy and surgery followed by additional cycles of chemotherapy alone as the standard of care for clinical stages T3 or T4, or for node-positive rectal cancer. Other clinical studies from the United States, Europe, and Asia have also influenced the treatment strategies for operable rectal cancer, as various approaches using preoperative or postoperative radiotherapy, with or without chemotherapy, have been examined. A summary of the major randomized clinical trials spanning the past several decades is provided below.

Prognostic Factors

Overall survival (OS) is most affected by the extent of disease, with increasing depth of rectal wall penetration and lymph node involvement being harbingers of worse outcome. Tumor location appears to be important in rectal cancer, with low-lying tumors having a greater propensity for local recurrence. Histological tumor grade is prognostic, with poorly differentiated tumors having a worse prognosis. The signet ring cell and mucinous varieties also portend a less favorable outcome. The mucinous variety can be visualized via magnetic resonance imaging (MRI) defined by greater than 50% mucin in the tumor, and this variety has recently been shown to respond less favorably to neoadjuvant chemoradiation. The pathologic circumferential resection margin (CRM) has been demonstrated to be prognostic, and at least one retrospective series confirms decreased cancer-specific survival with a CRM $\leq$2 mm. Additionally, the ypCRM status (after neoadjuvant chemoradiotherapy) is a significant risk factor for local recurrence. High-quality surgery with pathological evaluation of total mesorectal excision (TME) specimens is associated with a decreased risk of local recurrence. A pathological review of specimens from the Medical Research Council/United Kingdom (MRC CR07) trial, which required TME, clearly demonstrates that excellent surgical technique is directly related to local recurrence. Only 52% of the specimens demonstrated a "good" resection truly in the mesorectal plane, 34% were found to be "intermediate" in the intramesorectal plane, and 13% were "poor" involving the plane of the muscularis propria. The 3-year risk of local recurrence was directly related to quality of surgery, with high-quality surgery resulting in a lower recurrence. Importantly, all surgical groups, regardless of quality of resection, benefitted from neoadjuvant radiation therapy.

Dose

Preoperatively large radiotherapy portals covering the tumor, entire mesorectum, and lymph node regions at risk are typically treated to 45 Gy with a boost delivered to the tumor and presacral lymph nodes. The boost dose typically ranges in clinical trials from 5.4 to 9 Gy. The Radiation Therapy Oncology Group® (RTOG®) conducted a phase II study (R-0012) investigating combined-modality therapy with higher doses and hyperfractionation. Higher doses were associated with a similar pathologic complete response (pCR) rate at the cost of increased grade 3-4 acute toxicity; thus, the standard remains 50.4 to 54 Gy.

Postoperative Radiotherapy with or without Chemotherapy

Several classic trials have examined the use of postoperative irradiation alone or in combination with chemotherapy; conducted by the Gastrointestinal Tumor Study Group (GITSG), the North Central Cancer Treatment Group (NCCTG), and the Norwegian Adjuvant Rectal Cancer Project Group, radiotherapy delivered with concurrent chemotherapy improved both local control and survival. Subsequently, studies R-01 and R-02 by the National Surgical Adjuvant Breast and Bowel Project (NSABP) demonstrated that the role of radiotherapy is primarily local control in the postoperative setting.

The method of administrating chemotherapy appears to be important in obtaining optimal results. Protracted venous infusion of 5-fluorouracil (5-FU) was found to be superior to bolus 5-FU, with a 45% to 50% decrease in hematologic toxicity and is considered to be a standard adjuvant therapy; more recent studies have investigated alternate means of optimizing chemotherapy. The choice of early versus late radiotherapy with respect to chemotherapy may also be important according to the preliminary results of a recent randomized study and warrants further investigation. Because neoadjuvant chemoradiotherapy is superior to postoperative delivery, in cases where chemoradiation is clearly indicated, cT3-4 or N+ neoadjuvant delivery is preferred. (See Variant 1 and Variant 2 above.)

Preoperative Radiotherapy with or without Chemotherapy

Exploring the role of preoperative radiotherapy alone (25 Gy in 5 fractions), a Swedish trial showed improvements in both local control and survival that persisted at 13 years of follow-up. Late toxicity with this hypofractionated regimen is substantial and includes an increased risk of small-bowel obstruction, abdominal pain, diarrhea, bleeding, and fistula formation.

Both the MRC CR07 trial and the Dutch Colorectal Cancer Group (CKVO 95-04) investigated the role of radiation therapy with high-quality TME surgery. The Dutch study randomized 1,805 eligible patients to either surgery alone or short course radiation therapy (5 x 5 Gy) followed by surgery, and concluded that the addition of radiation significantly decreases the rate of local recurrence at 2 years even with high-quality surgery ($P<0.001$). The MRC CR07 study attempted to select high risk patients to selectively treat with radiation therapy; 1,350 patients were randomized to either neoadjuvant short-course radiation therapy (5 x 5 Gy) or selective postoperative concurrent chemoradiation therapy (45 Gy in 25 fractions with 5-FU) to those patients with CRM involvement (defined as ≤1 mm). Patients with resectable rectal cancer who received preoperative radiation had a decreased rate of local recurrence at 3 years compared to patients who received adjuvant long-term radiation therapy. Together, the CKVO 95-04 and MRC CR07 studies confirm that radiation improves local control even with TME surgical technique. Because of the toxicity of long-term radiation treatment and the inability to safely combine the hypofractionated radiotherapy regimen with systemic chemotherapy, this approach is rarely used in the United States or Southern Europe, but it is more common in Northern Europe.

Importantly, two trials from Europe have examined the role of incorporating concurrent chemotherapy with preoperative irradiation using standard radiotherapy fractionation, in keeping with the postoperative combined chemoradiotherapy model. Two studies (one by the European Organisation for Research and Treatment of Cancer [EORTC] 22921, the other by Fondation Française de Cancérologie Digestive [FFCD] 9203) demonstrated a significant improvement in local control, in the absence of a survival or sphincter-preservation benefit, with the addition of chemotherapy. As expected, acute toxicity was increased with the addition of chemotherapy, as had been noted in the FFCD 9203 trial.

Preoperative versus Postoperative Chemoradiotherapy

The important question of comparing preoperative versus postoperative chemoradiotherapy, as noted above, was addressed by a randomized trial from Germany. The preoperative regimen was associated with significantly improved local control and increased sphincter-preservation rates with no differences in disease-free or OS. As surgical technique continues to improve, it becomes increasingly difficult to demonstrate a benefit in disease-free survival (DFS) or OS. Neoadjuvant delivery also resulted in decreased rates of acute and chronic treatment toxicity, when compared to the postoperative approach. Another randomized trial (NSABP R03) exploring the same question in the United States was terminated early due to poor accrual. This study did not require TME, but it did show a trend towards improved survival, with a significant improvement in recurrence-free survival and DFS. Clinical response to the preoperative therapy was associated with significantly improved disease-free and OS. The current standard of care in the United States is, therefore, to provide preoperative chemoradiotherapy, using standard radiotherapy fractionation and concurrent fluorouracil for clinical stages T3 or T4, or for node-positive rectal cancer.

Simulation

Physical positioning to displace the small bowel is a simple way of maximizing the therapeutic ratio. A comparative study shows that when a patient is placed prone, the use of a belly board combined with a full bladder reduces the volume of small bowel irradiated by 70% (about 100 cc). Use of intensity-modulated radiation therapy (IMRT) with supine positioning potentially obviates the geometric benefit of placing the patient in the prone position on a belly board, which is uncomfortable and presumably more difficult for the patient to tolerate. A retrospective study comparing prone or supine setup with daily image guidance versus a no-action-level protocol confirmed that prone positioning leads to a greater systematic error. However, the study noted increased random error with the supine position. Error was decreased with either setup using increased frequency of image guidance. One study from the UK evaluated prone versus supine positioning in 19 consecutive patients and found the prone position did decrease dose to the small bowel, but primarily only in the low dose region of the dose-volume histogram. At doses above 20 Gy, there was no appreciable difference between supine and prone positioning, lending support to the notion of using the supine position in patients who may not tolerate lying prone with a full bladder.

Timing of Surgery

One of the major differences in the adjuvant trials from Europe versus those from the United States has been regarding the timing of surgery after chemoradiotherapy. The short-course regimens from Europe with surgery 1 week after completing radiotherapy have not allowed adequate time for downstaging, yet it appears that with a longer interval from neoadjuvant therapy to surgery downstaging may occur. In a retrospective review of patients treated with neoadjuvant chemoradiation followed by surgery with a time interval ≤7 weeks versus >7 weeks, the longer interval before surgery demonstrated an improved pCR and near-pCR rates as well as increased disease-free survival interval. A primary concern with an extended interval from chemoradiotherapy to surgery is that tumor clonogens are afforded time for repopulation and potential spread. A delay to surgery beyond 12 weeks has been investigated in selected patients and appears to be safe without an increase in metastatic spread.

Infusional versus Oral 5-FU

Since the advent of oral 5-FU, capecitabine, its equivalence has been called into question. A multitude of retrospective data exists with conflicting results. Several randomized phase III studies have recently been reported that add support to the use of capecitabine. NSABP R-04 is a randomized trial of radiotherapy with concurrent chemotherapy investigating four different chemotherapy regimens (5-FU or oral capecitabine with or without oxaliplatin). Preliminary results have recently been reported and show no significant difference between the arms with respect to pCR,

sphincter preservation, or downstaging. However, the addition of oxaliplatin was associated with a notable increase in grade 3 and 4 gastrointestinal (GI) toxicity. Another randomized trial of 401 patients from Germany comparing infusional 5-FU versus oral capecitabine concurrent with neoadjuvant radiation therapy suggests different toxicity profiles between the two chemotherapy regimens with less leucopenia and increased hand-foot skin reactions associated with capecitabine. This noninferiority German study suggests that oral capecitabine is not inferior to infusional 5-FU, and is associated with an increased rate of ypN0 tumors demonstrating increased downstaging with the oral drug.

Current Questions

The role of neoadjuvant chemoradiotherapy in resectable rectal cancer has been established, but the possibility of increasing the therapeutic gain via newer chemotherapeutic agents exists. Two large trials, the French ACCORD and the Italian STAR trial, both evaluate the role of oxaliplatin, which increases the efficacy of fluorouracil-based chemotherapy in treating colon cancer. These trials clearly show an increase in toxicity with the addition of oxaliplatin with no apparent improvement in local response. This use of oxaliplatin is supported by the recent preliminary results from NSABP R-04, which showed no apparent benefit with the addition of oxaliplatin to neoadjuvant concurrent chemoradiotherapy. The use of IMRT with capecitabine and oxaliplatin is being examined in a phase II study (RTOG® 08-22), but the results are not yet available. The role of biologic agents in treating rectal cancer has not yet been established.

The role of additional adjuvant chemotherapy after chemoradiotherapy in either the neoadjuvant or adjuvant setting is also in question. Although it is clearly indicated with colon cancer, several large trials from Europe and a meta-analysis have failed to show any benefit. Adjuvant chemotherapy after either neoadjuvant or adjuvant chemoradiotherapy has remained the standard of care based on extrapolated data from colon cancer. A randomized trial was initiated to determine whether additional chemotherapy is necessary in rectal cancer, but unfortunately due to lack of clinical equipoise, the study failed to accrue and closed early. Analysis of the Surveillance, Epidemiology, and End Results (SEER) database comparing patients who received adjuvant chemotherapy with those who did not suggests that patients who are node positive may benefit from additional chemotherapy.

IMRT has a demonstrated benefit in the treatment of anal malignancies, with fewer treatment breaks presumed to be due to the decreased toxicity associated with more conformal dose delivery. The RTOG® launched a phase II study investigating the use of IMRT for T3-4N0-2 patients with capecitabine and oxaliplatin. The preliminary results, presented in abstract form only, revealed a trend towards decreased preoperative GI grade ≥2 toxicity when compared to RTOG® 0247. A recent single-institution retrospective review comparing IMRT to classic 3-field conventional radiotherapy demonstrated a significant decrease in GI toxicity grade ≥2 for patients receiving IMRT. It is the consensus of the expert panel authoring this document that IMRT clearly decreases toxicity in the treatment of rectal cancer. Certain situations requiring larger treatment volumes such as postoperative therapy after an abdominoperineal resection (APR) or radiation of the inguinal nodes warrants a stronger recommendation for IMRT; however, there are concerns regarding delivery of IMRT outside the confines of a clinical trial. IMRT requires a greater knowledge of anatomic spread and understanding of the surrounding normal tissues and tolerances than the conventional 3-field pelvis treatment based on bony anatomy. This difficulty in contouring was clearly demonstrated in RTOG® 0529 where there were a significant number of inadequately contoured cases; however, due to a rapid review process, corrections were made prior to patient treatment. Multiple studies document the interobserver variability in target delineation with highly conformal therapy, and the need for guidance or aids in target delineation to avoid missing critical targets. The need for education regarding IMRT volumes in the pelvis was addressed by consensus panel of experts convened by RTOG® to create an anorectal contouring atlas that helps delineate targets. The preferred delivery for IMRT is via clinical trials; however, when being performed outside of a clinical trial, the atlas and peer review through colleagues or an established review process is strongly recommended.

Patients with low-lying rectal tumors extending below the dentate line and with extensive involvement of the anal canal receive treatment resembling that used for anal cancer, including treatment of the external iliac and inguinal nodes based on patterns of lymph node drainage. Retrospective data from MD Anderson Cancer Center suggests that the inguinal spread of rectal cancer, even with involvement of the anal canal, may be a rare event and that prophylactic radiotherapy to the groin may be unnecessary. This study defines patients having disease within 4 cm of the anal verge as having involvement of the anal canal, but it does not comment on extensive involvement with extension to the anal verge or margin. Further validation is necessary before omitting inguinal radiation therapy in patients with extensive involvement of the anal canal (see Variant 4 above).

Need for Future Trial

Despite the published data from randomized trials that support the shift to preoperative chemoradiotherapy, a subset of patients will require surgical resection upfront for a variety of clinical reasons. A pooled analysis of five randomized clinical trials in the United States suggests that not all patients with resected tumors may require a trimodality (surgery, chemotherapy, radiotherapy) treatment approach. Patients with favorable or "intermediate-risk" (T3N0 or T1-2N1) tumors were found to have benefited equally from either postoperative chemoradiotherapy or chemotherapy alone. Other data from the Memorial Sloan-Kettering Cancer Center (MSKCC) suggests that understaging may be a significant problem, as 22% of the patients in the trial who were cT3N0 were found to be pN+ at the time of surgery. A risk-adapted approach, selecting patients for minimal surgery based on their response to preoperative chemoradiotherapy has been investigated. Preliminary results from a recently reported small phase II trial by the American College of Surgeons Oncology Group (ACOSOG Z6041) suggests select patients who have a small

cT2N0 tumor may be candidates for preoperative chemoradiotherapy followed by local excision rather than proctectomy. The possibility of deferring or eliminating surgery for patients with a complete response to neoadjuvant chemoradiotherapy has also been suggested. A future clinical study is warranted to validate the appropriateness of such risk-adapted treatment-minimization strategies.

Abbreviations

- AP/PA, anteroposterior/posteroanterior
- APR, abdominoperineal resection
- CT, computed tomography
- EUS, endorectal ultrasound
- IMRT, intensity modulated radio therapy
- KPS, Karnofsky performance scale
- LAR, low anterior resection
- LN, lymph node
- RT, radiotherapy

Clinical Algorithm(s)

Algorithms were not developed from criteria guidelines.

Scope

Disease/Condition(s)

Resectable rectal cancer

Guideline Category

Evaluation

Management

Risk Assessment

Treatment

Clinical Specialty

Colon and Rectal Surgery

Gastroenterology

Internal Medicine

Oncology

Radiation Oncology

Radiology

Intended Users

Health Plans

Hospitals

Managed Care Organizations

Physicians

Utilization Management

Guideline Objective(s)

To evaluate the appropriateness of procedures for management and treatment of resectable rectal cancer

Target Population

Patients with resectable rectal cancer

Interventions and Practices Considered

1. Radiation therapy (RT)
    - RT + chemotherapy
    - RT alone
2. Chemotherapy alone
3. Preoperative and postoperative RT + chemotherapy or RT alone
4. RT volume and dosing
5. RT technique
    - 3 or 4 field with photons
    - Anteroposterior/posteroanterior (AP/PA)
    - 3 field with electron boost to perineum
    - 4 field with electron boost to perineum
6. Intensity-modulated radiation therapy (IMRT)
7. Surgery
    - Low anterior resection (LAR)
    - Abdominoperineal resection (APR)

Major Outcomes Considered

- Survival: disease-free, recurrence-free, overall
- Local control
- Anal sphincter-preservation rate
- Pathologic complete response (pCR)

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Literature Search Procedure

The Medline literature search is based on keywords provided by the topic author. The two general classes of keywords are those related to the condition (e.g., ankle pain, fever) and those that describe the diagnostic or therapeutic intervention of interest (e.g., mammography, MRI]).

The search terms and parameters are manipulated to produce the most relevant, current evidence to address the American College of Radiology Appropriateness Criteria (ACR AC) topic being reviewed or developed. Combining the clinical conditions and diagnostic modalities or therapeutic procedures narrows the search to be relevant to the topic. Exploding the term "diagnostic imaging" captures relevant results for diagnostic topics.

The following criteria/limits are used in the searches.

1. Articles that have abstracts available and are concerned with humans.
2. Restrict the search to the year prior to the last topic update or in some cases the author of the topic may specify which year range to use in the search. For new topics, the year range is restricted to the last 5 years unless the topic author provides other instructions.
3. May restrict the search to Adults only or Pediatrics only.
4. Articles consisting of only summaries or case reports are often excluded from final results.

The search strategy may be revised to improve the output as needed.

Number of Source Documents

The total number of source documents identified as the result of the literature search is not known.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Strength of Evidence Key

Category 1 - The conclusions of the study are valid and strongly supported by study design, analysis and results.

Category 2 - The conclusions of the study are likely valid, but study design does not permit certainty.

Category 3 - The conclusions of the study may be valid but the evidence supporting the conclusions is inconclusive or equivocal.

Category 4 - The conclusions of the study may not be valid because the evidence may not be reliable given the study design or analysis.

Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

The topic author drafts or revises the narrative text summarizing the evidence found in the literature. American College of Radiology (ACR) staff draft an evidence table based on the analysis of the selected literature. These tables rate the strength of the evidence for all articles included in the narrative text.

The expert panel reviews the narrative text, evidence table, and the supporting literature for each of the topic-variant combinations and assigns an appropriateness rating for each procedure listed in the table. Each individual panel member forms his/her own opinion based on his/her interpretation of the available evidence.

More information about the evidence table development process can be found in the ACR Appropriateness Criteria® Evidence Table Development document (see the "Availability of Companion Documents" field).

Methods Used to Formulate the Recommendations

Expert Consensus (Delphi)

Description of Methods Used to Formulate the Recommendations

Modified Delphi Technique

The appropriateness ratings for each of the procedures included in the Appropriateness Criteria topics are determined using a modified Delphi methodology. A series of surveys are conducted to elicit each panelist's expert interpretation of the evidence, based on the available data, regarding the appropriateness of an imaging or therapeutic procedure for a specific clinical scenario. American College of Radiology (ACR) staff distributes surveys to the panelists along with the evidence table and narrative. Each panelist interprets the available evidence and rates each procedure. The surveys are completed by panelists without consulting other panelists. The ratings are a scale between 1 and 9, which is further divided into three categories: 1, 2, or 3 is defined as "usually not appropriate"; 4, 5, or 6 is defined as "may be appropriate"; and 7, 8, or 9 is defined as "usually appropriate." Each panel member assigns one rating for each procedure per survey round. The surveys are collected and the results are tabulated, de-identified and redistributed after each round. A maximum of three rounds are conducted. The modified Delphi technique enables each panelist to express individual interpretations of the evidence and his or her expert opinion without excessive bias from fellow panelists in a simple, standardized and economical process.

Consensus among the panel members must be achieved to determine the final rating for each procedure. Consensus is defined as eighty percent (80%) agreement within a rating category. The final rating is determined by the median of all the ratings once consensus has been reached. Up to three rating rounds are conducted to achieve consensus.

If consensus is not reached, the panel is convened by conference call. The strengths and weaknesses of each imaging procedure that has not reached consensus are discussed and a final rating is proposed. If the panelists on the call agree, the rating is accepted as the panel's consensus. The document is circulated to all the panelists to make the final determination. If consensus cannot be reached on the call or when the document is circulated, "No consensus" appears in the rating column and the reasons for this decision are added to the comment sections.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The recommendations are based on analysis of the current literature and expert panel consensus.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Selection of appropriate treatment procedures for resectable rectal cancer

Potential Harms

Radiotherapy or chemotherapy toxicity

Qualifying Statements

Qualifying Statements

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Jones WE III, Thomas CR Jr, Suh WW, Herman JM, Abdel-Wahab M, Azad N, Blackstock AW, Das P, Goodman KA, Hong TS, Jabbour SK, Konski AA, Koong AC, Rodriguez-Bigas M, Small W Jr, Zook J, Expert Panel on Radiation Oncology - Rectal/Anal Cancer. ACR Appropriateness CriteriaÂ® resectable rectal cancer. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 9 p. [48 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

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Guideline Developer(s)

American College of Radiology - Medical Specialty Society

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Guideline Committee

Committee on Appropriateness Criteria, Expert Panel Radiation Oncology-Rectal/Anal Cancer

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Not stated

Guideline Status

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Guideline Availability

Electronic copies: Available from the American College of Radiology (ACR) Web site .

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900

Availability of Companion Documents

The following are available:

- ACR Appropriateness Criteria®. Overview. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.
- ACR Appropriateness Criteria®. Literature search process. Reston (VA): American College of Radiology; 1 p. Electronic copies: Available in PDF from the ACR Web site.
- ACR Appropriateness Criteria®. Evidence table development – diagnostic studies. Reston (VA): American College of Radiology; 2013 Nov. 3 p. Electronic copies: Available in PDF from the ACR Web site.
- ACR Appropriateness Criteria®. Evidence table development – therapeutic studies. Reston (VA): American College of Radiology; 2013 Nov. 4 p. Electronic copies: Available in PDF from the ACR Web site.
- ACR Appropriateness Criteria® resectable rectal cancer. Evidence table. Reston (VA): American College of Radiology; 2012. 28 p. Electronic copies: Available from the ACR Web site.

Patient Resources

None available

NGC Status

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